



(57) **Abstract:** A method of calculating a sampling function for fabricating a  $N$ -channel grating, the method comprising the steps of forming a summation of  $N$  periodic seeding functions each describing a refractive index variation, wherein each periodic function includes a phase shift value  $\Phi_l$  ( $l=1, \dots, N$ ) with respect to the other functions, and wherein at least one phase shift value is non-zero. The sampling function may be expressed as:  $\sum \exp[i(K_0 z + \Theta + (2l - N - 1)\Delta k z / 2 + \Phi_l)] = \kappa Q \exp[i(K_0 z + \Theta + \psi)]$ , where  $Q=Q(z)$  is the amplitude and  $\psi=\psi(z)$  is the phase of the sampling function, and the summation is performed over  $l=1, \dots, N$ . The method may further include the step of determining a set of the phase shift values for which a maximum value of the sampling function amplitude is minimised.